

GB 1460864
JAN 1977GROUP 321
CLASS 285
RECORDED

PLICATION

1460864

1460 864

- (21) Application No. 11308/74 (22) Filed 14 March 1974
 (23) Complete Specification filed 13 June 1975
 (44) Complete Specification published 6 Jan. 1977
 (51) INT CL' F16L 19/00
 (52) Index at acceptance F2G 25A 2B
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 CLASS 285
 RECORDED



(54) IMPROVEMENTS IN PIPE UNIONS

- (71) SPEY Q67 *A1007Y/01 +GB 1460-864
 Mfg. pipe union for incompatible threaded members - by threading tubular member, fitting union nut, screwing end member on and deforming threaded joint
 SPERRY & CO LTD 14.03.74-G8-011308
 (06.01.77) F161-19
- A pipe union for two incompatible threaded members is formed from a stamped union nut (1) held captive on a stamped and machined tubular member (2) secured to a forged member (3). The nut is tapped and the member (3) has an external tapered thread (6). The union is formed by first forming a thread on one end of the tubular member (2) and then passing the nut over this end. The member (3) is then screwed onto the tubular member and a ball plunger or roller burnishing tool inserted to expand the nut to bind the threads of the joint together to form a gas tight seal. 13. 6. 75 (4pp)
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- This invention relates to a method of forming a joint between two incompatible threaded members, such as a tubular member and a further member, which may be particularly useful in the manufacture of pipe unions.
- It is known to provide a joint between two incompatible threaded members by co-operation between the flanges of the nut and the tubular member on tightening of the union nut onto the first member, and a further metallic member secured to the other end of the tubular member and adapted to screw-threadedly engage with the second screw-threaded member, the union nut being held captive on the tubular member by the flange on the tubular member and said further member which has a sufficiently large transverse dimension to prevent passage of the union nut over said further member.
- Unions of this kind have been used for connecting gas appliances together, for connecting a meter service governor to a meter for example.
- It is known to connect the tubular member to said further member after assembly of the union nut onto the tubular member by screwing and brazing the tubular member to said further member.
- This is, however, an expensive operation, requires testing of the seal between the two members, and has a high reject rate. Moreover the seal between the two members may be broken when the union is
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 other end is formed with an external screw
 thread for engagement with a co-operating
 internal screw thread formed in said further
 member.
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 Usually the further member will be
 formed with an external radially extending
 polygonal flange for engagement by a
 spanner when the further member is
 tightened in use to the second member. It is
 this polygonal flange which would prevent
 assembly of the union nut onto the tubular
 member if the tubular member were to be
 made integral with the further member.
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 The tubular member and the further
 member may be made of any suitable metal
 but preferably they are made of brass.
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 The expansion of the joint between the
 tubular member and the further member is
 conveniently performed by cold forming
 with a ball plunger or roller burnishing tool.
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 The invention will now be further
 described, by way of example only, with
 reference to the accompanying drawing
 which is an axial cross section of a com-
 pleted brass union adapted to secure an
 externally screw-threaded first member to an
 internally screw-threaded second
 member to provide fluid communication
 therebetween.

- The union comprises a stamped union nut 1 held captive on a stamped and machined tubular member 2 secured to a further member 3 which is a forging.
- 5 The union nut 1 is internally screw-threaded for engagement with external screw threads on a first member, not shown, and is provided with an internal radial flange 4 for engagement with an external radial flange 5 which is an integral part of one end of the tubular member 2. When the union nut 1 is screwed in use onto the first member the tubular member 2 is drawn towards the first member by the engagement between 10 the flanges 4 and 5.
- 15 The further member 3 is formed with an external tapered screw thread 6 for engagement with an internal co-operating screw thread of a second member, not shown, and is provided with an integral polygonal radial flange 7 for engagement by a spanner during tightening in use of the further member 7 to the second member.
- Initially the other end 8 of the tubular 20 member 3 comprises a plain sleeve. Prior to assembly of the union nut 1 onto the sleeve the exterior of said other end 8 is formed with a plain external screw thread for engagement with a complementary screw 25 thread formed internally of the further member 3. The union nut is then assembled onto the tubular member 2 by passing it over said other end 8 of the tubular member. The tubular member and the further member are 30 then screwed together and a ball plunger or roller burnishing tool is inserted into the joint between the members by passing it through the further member 3, and the joint between the members is expanded radially 35 over the distance A by cold forming to increase the internal diameter D of the joint and to bind the screw threads of the joint together to form a gas-tight seal between the tubular member 2 and the further member 40
- 45 3. In one example the initial diameter D is 0.875 inches and a plunging tool of 0.925" diameter is used. The diameter D is thus increased by slightly more than 4% of its initial value.
- 50 In order to increase the break-loose torque of the joint between the members 2 and 3 a drop of a screw-thread locking material such as that sold under the 55 Registered Trade Mark 'LOCTITE' STUDLOCK (OR GRADE 75) is applied to the middle part of one of the screw threads before the members 2 and 3 are screwed together.
- WHAT WE CLAIM IS:—
1. A method of manufacturing a pipe union of the kind set forth comprising forming said other end of the tubular member and said further member with complementary screw threads, assembling the union nut onto the tubular member by passing it over said other end of the tubular members, screwing said tubular member to said further member, and then permanently deforming the screw-threaded joint between said tubular member and said further member by expanding the joint radially. 60
 2. The method according to claim 1 in which the tubular member is formed with its screw thread prior to assembling the union nut onto the tubular member. 65
 3. The method according to claim 1 or claim 2 in which prior to screwing the tubular member to said further member screw-thread locking material is applied to at least one of the co-operating screw threads. 70
 4. The method according to any of the preceding claims in which the co-operating screw threads comprise an external screw thread formed on the tubular member and an internal screw thread formed on said further member. 75
 5. The method according to any of the preceding claims in which the expansion of the joint is performed by cold forming. 80
 6. The method according to claim 5 in which the joint between the tubular member is expanded by insertion of a ball plunger. 85
 7. The method according to claim 5 in which the joint between the tubular member is expanded by a roller burnishing tool. 90
 8. The method according to any of the preceding claims in which the tubular member and said further member are of brass. 95
 9. The method according to any of the preceding claims in which the internal diameter of the joint between the tubular member and said further member is increased by more than four per cent of the initial diameter. 100
 10. The method according to claim 1 and substantially as described with reference to the accompanying drawing. 105
 11. A pipe union of the kind set forth produced by the method according to any of the preceding claims. 110
 12. A pipe union of the kind set forth manufactured according to the method of claim 10 and substantially as described with reference to the accompanying drawing. 115

- The union comprises a stamped union nut 1 held captive on a stamped and machined tubular member 2 secured to a further member 3 which is a forging.
- 5 The union nut 1 is internally screw-threaded for engagement with external screw threads on a first member, not shown, and is provided with an internal radial flange 4 for engagement with an external radial flange 5 which is an integral part of one end of the tubular member 2. When the union nut 1 is screwed in use onto the first member the tubular member 2 is drawn towards the first member by the engagement between the flanges 4 and 5.
- 10 The further member 3 is formed with an external tapered screw thread 6 for engagement with an internal co-operating screw thread of a second member, not shown, and is provided with an integral polygonal radial flange 7 for engagement by a spanner during tightening in use of the further member 7 to the second member.
- 15 Initially the other end 8 of the tubular member 3 comprises a plain sleeve. Prior to assembly of the union nut 1 onto the sleeve the exterior of said other end 8 is formed with a plain external screw thread for engagement with a complementary screw thread formed internally of the further member 3. The union nut is then assembled onto the tubular member 2 by passing it over said other end 8 of the tubular member. The tubular member and the further member are 20 then screwed together and a ball plunger or roller burnishing tool is inserted into the joint between the members by passing it through the further member 3, and the joint between the members is expanded radially over the distance A by cold forming to increase the internal diameter D of the joint and to bind the screw threads of the joint together to form a gas-tight seal between the tubular member 2 and the further member 3.
- 25 In one example the initial diameter D is 0.875 inches and a plunging tool of 0.925" diameter is used. The diameter D is thus increased by slightly more than 4% of its initial value.
- 30 In order to increase the break-loose torque of the joint between the members 2 and 3 a drop of a screw-thread locking material such as that sold under the registered Trade Mark 'LOCTITE' STUDLOCK (OR GRADE 75) is applied to the middle part of one of the screw threads before the members 2 and 3 are screwed together.
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- WHAT WE CLAIM IS:—**
1. A method of manufacturing a pipe union of the kind set forth comprising forming said other end of the tubular member and said further member with complementary screw threads, assembling the union nut onto the tubular member by passing it over said other end of the tubular members, screwing said tubular member to said further member, and then permanently deforming the screw-threaded joint between said tubular member and said further member by expanding the joint radially.
 2. The method according to claim 1 in which the tubular member is formed with its screw thread prior to assembling the union nut onto the tubular member.
 3. The method according to claim 1 or claim 2 in which prior to screwing the tubular member to said further member screw-thread locking material is applied to at least one of the co-operating screw threads.
 4. The method according to any of the preceding claims in which the co-operating screw threads comprise an external screw thread formed on the tubular member and an internal screw thread formed on said further member.
 5. The method according to any of the preceding claims in which the expansion of the joint is performed by cold forming.
 6. The method according to claim 5 in which the joint between the tubular member is expanded by insertion of a ball plunger.
 7. The method according to claim 5 in which the joint between the tubular member is expanded by a roller burnishing tool.
 8. The method according to any of the preceding claims in which the tubular member and said further member are of brass.
 9. The method according to any of the preceding claims in which the internal diameter of the joint between the tubular member and said further member is increased by more than four per cent of the initial diameter.
 10. The method according to claim 1 and substantially as described with reference to the accompanying drawing.
 11. A pipe union of the kind set forth produced by the method according to any of the preceding claims.
 12. A pipe union of the kind set forth manufactured according to the method of claim 10 and substantially as described with reference to the accompanying drawing.

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Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1977.
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from
which copies may be obtained.